

What is claimed is:

1. A duty ratio control device for varying a ratio between an ON-time and an OFF-time in one cycle to control an amount of electric current supplied to an electric actuator, wherein

when a large amount of electric current is supplied to said electric actuator, a time of said cycle becomes longer than a case in which a small amount of electric current is supplied thereto.

2. The duty ratio control device according to claim 1, wherein

time of said cycle is continuously extended, as the amount of electric current supplied to said electric actuator increases.

3. The duty ratio control device according to claim 1, wherein

time of said cycle is extended in stages, as the amount of electric current supplied to said electric actuator increases.

4. The duty ratio control device according to claim 1, wherein

said electric actuator displaces the position of a valve body of a valve in accordance with the amount of supplied electric current.

5. The duty ratio control device according to claim 4,
wherein

 said valve comprising:

 a rotary driving element rotationally driven in synchronization with a crank shaft of an internal combustion engine; and

 a rotary driven element relatively rotatable with respect to said rotary driving element and rotating integrally with a cam shaft of said internal combustion engine; wherein

 said valve is combined with a variable cam timing mechanism, said variable cam timing mechanism supplying oil pressure to an advance angle side chamber formed between said rotary driving element and said rotary driven element, in order to displace said cam shaft with said rotary driven element on an advance angle side with respect to said rotary driving element, and supplying oil pressure to a retarded angle side chamber formed between said rotary driving element and said rotary driven element, in order to displace said cam shaft with said rotary driven element on a retarded angle side with respect to said rotary driving element, and

 said valve is an oil flow control valve for relatively supplying/ejecting oil pressure occurring in an oil pressure source to/from said advance angle side chamber and said retarded angle side chamber during the operation of said internal combustion engine.

6. The duty ratio control device according to claim 1, the actuator further comprising:

a moveable portion; and

a yoke, wherein the yoke accommodates the moveable portion so the moveable portion can reciprocate, said yoke capable of transmitting a magnetic flux to the movable portion.

7. An apparatus comprising:

a duty ratio control device;

an electric actuator, wherein said duty ratio control device varies a ratio between an ON-time and an OFF-time in one cycle to control an amount of electric current supplied to said electric actuator such that when a large amount of electric current is supplied to said electric actuator, a time of said cycle becomes longer than a case in which a small amount of electric current is supplied to said actuator; and

a valve, wherein said electric actuator displaces a position of a valve body of said valve in accordance with the amount of electric current supplied.

8. The apparatus of claim 7, said valve further comprising:

a rotary driving element rotationally driven in synchronization with a crank shaft of an internal combustion

engine; and

a rotary driven element relatively rotatable with respect to said rotary driving element and rotating integrally with a cam shaft of said internal combustion engine; wherein

said valve is combined with a variable cam timing mechanism, said variable cam timing mechanism supplying oil pressure to an advance angle side chamber formed between said rotary driving element and said rotary driven element, in order to displace said cam shaft with said rotary driven element on an advance angle side with respect to said rotary driving element, and supplying oil pressure to a retarded angle side chamber formed between said rotary driving element and said rotary driven element, in order to displace said cam shaft with said rotary driven element on a retarded angle side with respect to said rotary driving element, and

said valve is an oil flow control valve for relatively supplying/ejecting oil pressure occurring in an oil pressure source to/from said advance angle side chamber and said retarded angle side chamber during the operation of said internal combustion engine.